

# Notice of Allowability

Application No.

09/345,698

Examiner

Tuan V. Thai

Applicant(s)

BARLETT ET AL.

Art Unit

2186

## -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

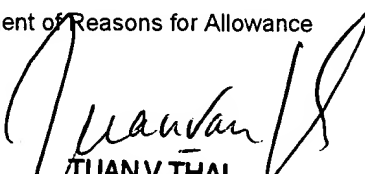
1. ☒ This communication is responsive to RCE filed 5/24/04 and IDSs filed 5/24/04; 6/17/04; 8/16/04; 10/04/04.
2. ☒ The allowed claim(s) is/are 84, 88, 89, 92-107, 110-112, 116-120, 123-126, 130-131, 134-136 renumbered as 1-9, 11-13, 15-18, 14, 10, 19-27, 29-30, 28 and 31-36 respectively.
3. ☒ The drawings filed on 30 June 1999 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
  - \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date see Number 1 above
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
TUAN V. THAI  
PRIMARY EXAMINER

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Attorney's Docket No.: 5053-23800

IN THE UNITED STATES PATENT AND  
TRADEMARK OFFICE

In re application of: Barlett et al.                      Group: 2186  
Serial No.: 09/345,698                      Examiner: Tuan Thai  
For: *SYSTEM AND METHOD FOR SYNCHRONIZING COPIES OF DATA IN  
COMPUTER SYSTEM.*

1. This action is responsive to Request for Continuation filed May 24, 2004 and Examiner interview conducted on November 12, 2004. Claims 1-83 have been previously canceled. Claims 85-87, 90-91, 108-109, 113-115, 121-122, 127-129 and 132-133 are now canceled. Claims 84, 88-89, 92-107, 110-112, 116-120, 123-126, 130-131 and 134-136 are now allowed.

EXAMINER'S AMENDMENT

2. An Examiner's Amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 C.F.R. § 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the Issue Fee.

3. Authorization for this Examiner's Amendment was given in a

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telephone interview with Mr. Mark DeLuca; Reg. No. 44,649 on November 12, 2004.

4. The application has been amended as follows:

a. In the claims:

a1. Cancel claims 85-87, 90-91, 108-109, 113-115, 121-122, 127-129 and 132-133

a2. Please amend claims 84, 88, 92, 95, 107, 110, 116, 119, 123-124, 126, 130-131 and 134-136 as follow:

*Claim 84 (amended).* A method comprising:

reading a first copy of a primary data set in a primary memory location;

storing the first copy in a first memory location;

setting a first validity flag to indicate that the first copy is valid;

reading a second copy of the primary data set in the primary memory location;

storing the second copy in a second memory location;

setting a second validity flag to indicate that the second copy is valid;

modifying the first copy;

setting the second validity flag to indicate that the second copy is invalid after modifying the first copy;

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replacing the primary data set with the modified first copy after the modifying of the first copy and before the setting of the second validity flag to indicate that the second copy is invalid;

replacing the second copy with the primary data set after the setting of the second validity flag to indicate that the second copy is invalid;

setting the second validity flag to indicate that the second copy is valid after replacing the second copy with the primary data set;

creating a first index corresponding to the first copy, wherein the first index is stored in a fourth memory location, wherein the first index is created after reading the first copy from the primary data set; and

creating a second index corresponding to the second copy, wherein the second index is stored in the fourth memory location, wherein the second index is created after reading the second copy from the primary data set[.];

locating the second validity flag by using the second index before setting the second validity flag to indicate that the second copy is invalid;

wherein an index comprises:

a first field comprising a description of a copy of the data for which the index was created; and

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a second field comprising a memory location for a validity flag for the copy of the data set for which the index was created;

matching the first index and the second index by comparing the first field of the first index and the first field of the second index;

wherein locating the second validity flag further comprises locating the second validity flag by referencing contents of the second field of the second index;

wherein a first program is associated with the first copy and a second program is associated with the second copy;

the first program requesting that a third program synchronize the first copy with other copies of the primary data set;

the third program creating the first index corresponding to the first copy in the fourth memory location in response to the first program requesting that the third program synchronize the first copy with other copies of the primary data set;

the second program requesting that the third program synchronize the second copy with other copies of the primary data set; and

the third program creating the second index corresponding to the second copy in the fourth memory location in response to the second program requesting that the third program synchronize the

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second copy with other copies of the primary data set.

*Claim 88 (amended)* On line 1, replace "claim 87" with --claim 84--.

*Claim 92 (amended)* On line 1, replace "claim 90" with --claim 84--.

*Claim 95 (amended)* On line 1, replace "claim 90" with --claim 84--.

*Claim 107 (amended)* A system comprising:

a plurality of computers comprising a cluster, wherein a computer comprises a local memory and at least one validity flag, and wherein a copy of a data set that is stored in the local memory is assigned at least one corresponding validity flag;

a coupling system comprising a local memory, wherein the coupling system is connected to each of the computers in the cluster, and wherein the coupling system is configured to coordinate data sharing of the cluster; and

an external data storage shared by the computers in the cluster;

wherein the local memories of the computers or the coupling system store program instructions, wherein the program

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instructions are executable by the computers or the coupling system to:

- read a first copy of a primary data set in a primary memory location;

- store the first copy in a first memory location;

- set a first validity flag to indicate that the first copy is valid;

- read a second copy of the primary data set in the primary memory location;

- store the second copy in a second memory location;

- set a second validity flag to indicate that the second copy is valid;

- modify the first copy;

- set the second validity flag to indicate that the second copy is invalid after modifying the first copy;

- replace the primary data set with the modified first copy after the modifying of the first copy and before the setting of the second validity flag to indicate that the second copy is invalid;

- replace the second copy with the primary data set after the setting of the second validity flag to indicate that the second copy is invalid;

- set the second validity flag to indicate that the second copy is valid after replacing the second copy with the primary

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data set;

create a first index corresponding to the first copy, wherein the first index is stored in a fourth memory location, wherein the first index is created after reading the first copy from the primary data set; and

create a second index corresponding to the second copy, wherein the second index is stored in the fourth memory location, wherein the second index is created after reading the second copy from the primary data set[.];

wherein the program instructions are further executable to locate the second validity flag by using the second index before setting the second validity flag to indicate that the second copy is invalid;

wherein an index comprises a first field comprising a description of a copy of the data the index was created for; and a second field comprising a memory location for a validity flag for the copy of the data set the index was created for;

wherein the program instructions further comprise a first program associated with the first copy and a second program associated with the second copy;

wherein the program instructions further comprise a third program which is configured to manage the synchronization of copies of data sets being used by the first and second programs;

wherein the first program is executable to request that the



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third program synchronize the first copy with other copies of the data set;

wherein the third program is executable to create the first index corresponding to the first copy in the fourth memory location in response to the first program requesting that the third program synchronize the first copy with other copies of the data set;

wherein the second program is executable to request that the third program synchronize the second copy with other copies of the primary data set; and

wherein the third program is executable to create the second index corresponding to the second copy in the fourth memory location in response to the second program requesting that the third program synchronize the second copy with other copies of the data set.

**Claim 110 (amended)** On line 1, replace "claim 109" with --claim 107--.

**Claim 116 (amended)** On line 1, replace "claim 114" with --claim 107--.

**Claim 119 (amended)** A system comprising:

a plurality of computers comprising a cluster, wherein a

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computer comprises a local memory and at least one validity flag, and wherein a copy of a data set that is stored in the local memory is assigned at least one corresponding validity flag;

a coupling system comprising a local memory, wherein the coupling system is connected to each of the computers in the cluster, and wherein the coupling system is configured to coordinate data sharing of the cluster;

an external data storage shared by the computers in the cluster;

wherein the local memories of the computers or the coupling system store program instructions, wherein the program instructions are executable by the computers or the coupling system to:

read a first copy of a primary data set in a primary memory location;

store the first copy in a first memory location;

set a first validity flag to indicate that the first copy is valid;

read a second copy of the primary data set in the primary memory location;

store the second copy in a second memory location;

set a second validity flag to indicate that the second copy is valid;

modify the first copy; and

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set the second validity flag to indicate that the second copy is invalid after modifying the first copy;

wherein each computer further stores a coupling system interface program which is executable to communicate between the coupling system and a plurality of programs running on the computer;

wherein the local memory of a first computer in the cluster comprises the first memory location, the local memory of a second computer in the cluster comprises the second memory location, the external data storage comprises the primary memory location, and the local memory of the coupling system comprises [the] a fourth memory location;

create a copy of the primary data set in the local memory of a plurality of computers in the cluster, wherein in creating the copy, the program instructions are further executable to:

create an index corresponding to the copy of the primary data set in the local memory of the coupling system;

assign a validity flag to the copy of the primary data set; and

set the validity flag to indicate that the copy of the primary data set is valid[.];

wherein the first computer further includes a first program associated with the first copy, and the second computer further includes a second program associated with the second copy;

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wherein the first program is executable to:

read the first copy of the data set from the primary data set in the primary memory location;

store the first copy in the first memory location;

create the first index to the first copy; and

send a request to synchronize the first copy with other copies of the data set to the coupling system interface, wherein the first program is executable to send the first index to a third program;

wherein the coupling system interface program is executable to forward the request to synchronize the first copy to the coupling system;

wherein the coupling system is executable to:

store the first index to the first copy in the fourth memory location in response to the request; and

send a first token to the coupling system interface, the first token comprising a location for the validity flag to be used for the first copy;

wherein the coupling system interface program is executable to send the first token to the first program;

wherein the first program is executable to store the first token in the first memory;

wherein the second program is executable to:

read the second copy of the primary data set from

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the primary data set in the primary memory location;  
store the second copy in the second memory  
location;

create the second index to the second copy; and  
send a request to synchronize the second copy with  
other copies of the primary data set to the coupling  
system interface, wherein the second program is  
executable to send the second index to the third  
program;

wherein the coupling system interface program is executable  
to forward the request to synchronize the second copy to the  
coupling system;

wherein the coupling system is executable to:

store the second index to the second copy in the  
fourth memory location in response to the request; and  
send a second token to the coupling system  
interface, the second token comprising a location for  
the validity flag to be used for the second copy;

wherein the coupling system interface program is executable  
to send the second token to the second program; and

wherein the second program is executable to store the second  
token in the second memory.

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**Claim 123 (amended)** On line 1, replace "claim 121" with --claim 119--.

**Claim 124 (amended)** On line 1, replace "claim 121" with --claim 119--.

**Claim 126 (amended)** A [carrier medium comprising] computer readable medium containing program instructions, wherein the program instructions are executable by a machine to implement:

- reading a first copy of a primary data set in a primary memory location;
- storing the first copy in a first memory location;
- setting a first validity flag to indicate that the first copy is valid;
- reading a second copy of the primary data set in the primary memory location;
- storing the second copy in a second memory location;
- setting a second validity flag to indicate that the second copy is valid;
- modifying the first copy;
- setting the second validity flag to indicate that the second copy is invalid after modifying the first copy;
- replacing the primary data set with the modified first copy

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after the modifying of the first copy and before the setting of the second validity flag to indicate that the second copy is invalid;

replacing the second copy with the primary data set after the setting of the second validity flag to indicate that the second copy is invalid;

setting the second validity flag to indicate that the second copy is valid after replacing the second copy with the primary data set;

creating a first index corresponding to the first copy, wherein the first index is stored in a fourth memory location, wherein the first index is created after reading the first copy from the primary data set; and

creating a second index corresponding to the second copy, wherein the second index is stored in the fourth memory location, wherein the second index is created after reading the second copy from the primary data set[.];

wherein the program instructions are further executable by the machine to implement locating the second validity flag by using the second index before setting the second validity flag to indicate that the second copy is invalid;

wherein an index comprises:

a first field comprising a description of a copy of the data for which the index was created;

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a second field comprising a memory location for a validity flag for the copy of the data set for which the index was created;

wherein the program instructions are further executable by the machine to implement matching the first index and the second index by comparing the first field of the first index and the first field of the second index; and locating the second validity flag by referencing contents of the second field of the second index;

wherein a first program is associated with the first copy and a second program is associated with the second copy;

wherein the program instructions are further executable by a machine to implement the first program requesting that a third program synchronize the first copy with other copies of the data set; the third program creating the first index corresponding to the first copy in the fourth memory location in response to the first program requesting that the third program synchronize the first copy with other copies of the data set; the second program requesting that the third program synchronize the second copy with other copies of the data set; and

the third program creating the second index corresponding to the second copy in the fourth memory location in response to the second program requesting that the third program synchronize the second copy with other copies of the data set.



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*Claim 130 (amended)* On line 1, replace the recitation of "carrier medium of claim 129" with --computer readable medium of claim 126--.

*Claim 131 (amended)* On line 1, replace the recitation of "carrier" with --computer readable--.

*Claim 134 (amended)* On line 1, replace the recitation of "carrier medium of claim 132" with --computer readable medium of claim 126--.

*Claim 135 (amended)* On line 1, replace the recitation of "carrier" with --computer readable--.

*Claim 136 (amended)* On line 1, replace the recitation of "carrier" with --computer readable--.

#### REASONS FOR ALLOWANCE

5. The following is an Examiner's Statement of Reasons for Allowance:

The prior arts of record do not teach nor suggest, either alone or in combination, all the limitations of the claimed invention (claims 84, 107, 119 and 126) with a method and system

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for synchronizing multiple copies of data in a computer system, the synchronizing computer system of the current invention having a cluster wherein each computer in the cluster storing a local copy of a data set along with a validity flag for the local copy; and further comprises a coupling system for coordinating the data sharing and workload of the cluster. A coupling system interface program implemented on the coupling system for controlling of the data synchronization wherein the application interface is accessible by a plurality of application program. Particularly, the prior art of record do not disclose the creating of a copy of the primary data set in the local memory of a plurality of computers in the cluster *by creating an index corresponding to the copy of the primary data set in the local memory of the coupling system*, assigning and setting a validity flag to the copy of the primary data set, and all the specific steps and elements to carry out the synchronizing process as being claimed.

Claims 88-89, 92-106, 110-112, 116-118, 120, 123-125, 130-131 and 134-136 further limit the allowable independent claims. These claims are therefore allowable for the same reason as set forth above.

Any comments considered necessary by Applicant must be submitted no later than the payment of the Issue Fee and, to avoid processing delays, should preferably **accompany** the Issue Fee. Such submissions should be clearly labeled "Comments on

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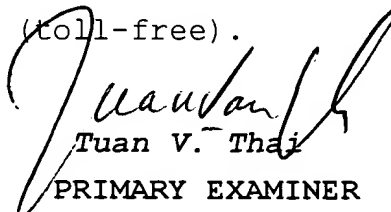
Statement of Reasons for Allowance."

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan V. Thai whose telephone number is (571)-272-4187. The examiner can normally be reached on from 6:30 A.M. to 4:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mathew M. Kim can be reached on (571)-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVT/November 12, 2004

  
Tuan V. Thai  
PRIMARY EXAMINER  
Group 2100